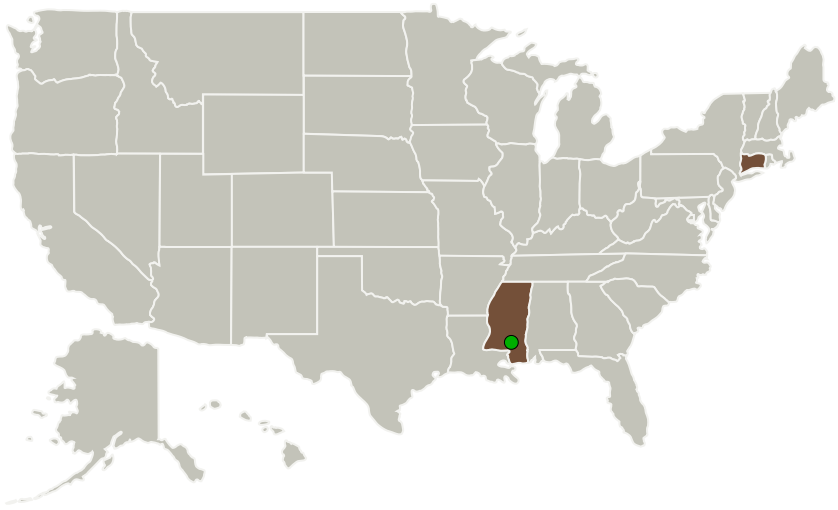
Hydrogen-Based Energy Conservation System, Phase II

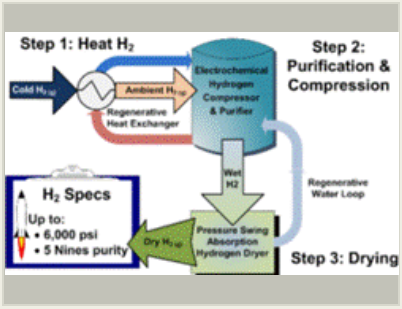
Completed Technology Project (2013 - 2016)

Project Introduction

Sustainable Innovations is developing a technology for efficient separation and compression of hydrogen gas. The electrochemical hydrogen separator and compressor can actively remove hydrogen from a mixture and compress it to high pressure for storage or use. In applications where helium is used as a purge gas prior to the use of liquid hydrogen or use of cold hydrogen from cryogenic storage boil-off, the compressor system is suitable for separation of the hydrogen from the helium in the resulting mixed stream. This technology allows a significant portion of either gas to be recycled and conserved. In applications requiring recycling of helium where abundant hydrogen is present, it is practical to utilize the energy content of a portion of the hydrogen to power the electrochemical separation of hydrogen from the helium. This novel application leverages hydrogen that was destined for flaring and oxidizes it electrochemically to power separation of hydrogen from helium, thus allowing recovery of the helium and delivering net power.

Primary U.S. Work Locations and Key Partners





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Organizations Performing Work	Role	Type	Location
Sustainable Innovations, LLC	Lead Organization	Industry	East Hartford, Connecticut
Skyre Inc	Supporting Organization	Industry Small Disadvantaged Business (SDB)	
Stennis Space Center(SSC)	Supporting Organization	NASA Center	Stennis Space Center, Mississippi
University of Connecticut	Supporting Organization	Academia	Storrs, Connecticut

Primary U.S. Work Locations	
Connecticut	Mississippi

Project Transitions

September 2013: Project Start

October 2016: Closed out

Closeout Summary: Hydrogen-Based Energy Conservation System, Phase II Project Image

Closeout Documentation:

- Final Summary Chart Image*(https://techport.nasa.gov/file/137562)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Sustainable Innovations, LLC

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Trent Molter

Co-Investigator:

Trent Molter

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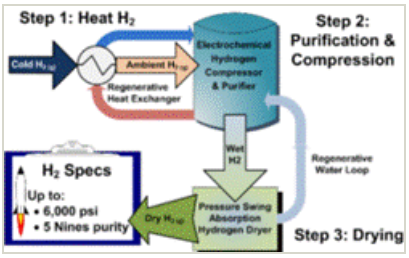
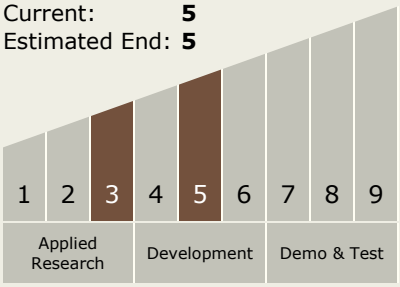
Images



Briefing Chart Image
Hydrogen-Based Energy Conservation System, Phase II *(https://techport.nasa.gov/image/134001)*

Technology Maturity (TRL)

Start: **3**
Current: **5**
Estimated End: **5**



Technology Areas

Primary:

- TX01 Propulsion Systems
  - TX01.1 Chemical Space Propulsion
    - TX01.1.3 Cryogenic

Target Destinations

Earth, The Moon, Others Inside the Solar System, Outside the Solar System, The Sun, Mars